

# Contractor Selection in Saudi Arabia

M. A. Bajaber and M. A. Taha

**Abstract**—Contractor selection in Saudi Arabia is very important due to the large construction boom and the contractor role to get over construction risks. The need for investigating contractor selection is due to the following reasons; large number of defaulted or failed projects (18%), large number of disputes attributed to contractor during the project execution stage (almost twofold), the extension of the General Agreement on Tariffs and Trade (GATT) into construction industry, and finally the few number of researches. The selection strategy is not perfect and considered as the reason behind irresponsible contractors. As a response, this research was conducted to review the contractor selection strategies as an integral part of a long advanced research to develop a good selection model. Many techniques can be used to form a selection strategy; multi criteria for optimizing decision, prequalification to discover contractor's responsibility, bidding process for competition, third party guarantee to enhance the selection, and fuzzy techniques for ambiguities and incomplete information.

**Keywords**—Bidding, Construction industry, Contractor selection, Saudi Arabia.

## I. INTRODUCTION

SAUDI Arabia has experienced a construction boom since the beginning of the five-year national development plans in 1970. A great portion of Saudi national income has been spent on building the country infrastructure, for example, the construction sector in the first and second five-year plans received 49.6% and 32% respectively [1]. However, the construction industry is exposed to a number of risks at the industry level such as; insufficient qualified contractors and the participation of unqualified contractors, in addition to other risks exist at the project level such as; delivery delays and equipment breakdowns. Each one of the project participants bears a specific part of responsibility to encounter these risks. But, in the most cases, contractor is the first one who deals with these risks and if he is qualified enough, he would be able to get over them. If he fails to do, he may default, and if he did, nobody would benefit.

Construction industry has a special nature represented in a difficult environment and complex works. It consists of different operations with cooperation of skilled labors and with involvement of multiple entities, who may work together for the first time and may never work again. They will work at a limited space, for a short time and fixed dates, committing themselves to a specific quality, and proceeding together to achieve one final goal [2]. Any interruption or dispute can lead to a failure in which nobody will benefit. Whenever a cause

becomes strong enough to make a failure, the contractor will be subject to fail. This failure may have negative impacts on other ongoing projects or lead to another failure at the organization level [3]. In this case, the owner would carry out different costs like; (1) loss of profits due to delay, (2) managerial costs dealing with failure, (3) cost to complete project, (4) conflict's resolution or litigation costs, (5) loss of reputation and goodwill [4]. Even if contractor is guaranteed financially by a third party, owner will likely to bear an increase in the project costs reaching by average to 15.3% in USA [3].

A symposium about defaulted projects in Saudi Arabia coincident with the eighth annual meeting of the Saudi Society for Civil Engineering was held at Jeddah in 2012. Hanfi A. A. said there was no exact statistics about defaulted projects [5], however, Brahmin S. Y. referred to a governmental study carried out for a sample of projects within the province area of Makah [6]. The study showed that projects defaulted in 13% with 44 Billion Riyals and failed in 5% with 600 million Riyals. Symposium participants demonstrated that contractors become not responsible due to insufficient financial or technical capabilities, insufficient experience, taking a size of job graters than capabilities, and unqualified labors. Irresponsible contractors appear in the project scene because: (1) entering into the industry was easy, only 2177 contractors were classified among 280,000 contractors who had an official registrations to practice contracting in general [5], (2) there is an absence of a real owner evaluation at the government departments [7], and (3) the current selection strategy based on lowest price criterion doesn't support the appearance of qualified contractors.

The large number of defaults in construction projects is a main reason call for this study. Some examples of project defaults in Saudi Arabia are; building failures [10]-[11], contractor's bankruptcy, and schedule delays [12]. Contracting strategy in Saudi Arabia, which awards projects to the lowest bidder, might be attributed for a lot of defaults [13]. AlSobiei and et al. showed that contractors were defaulted in 23 out of few hundred projects during a 5-year period of a study conducted in the general directorate of military works in Saudi Arabia [4]. It demonstrates that these defaults might be avoided if the owners had taken a position to discriminate between contractors to avoid those ones who were likely to default. Accordingly, the participants of the referred Jeddah symposium (2012) recommended the revising of contractor selection criteria and strategies in Saudi Arabia according to the international standards.

Another reason is the large number of disputes and claims in construction projects [2], [12], [14]. Several governmental organizations in Saudi Arabia do not have sufficient

Mohamad A. Bajaber, a Ph.D. Candidate and Research Assistant, Department of Civil Engineering, KAU University, Saudi Arabia (e-mail: md.bajaber@gmail.com).

Mahmoud A. Taha, Associate Professor, Department of Civil Engineering, KAU University, Saudi Arabia (e-mail: msaleem@kau.edu.sa).

management systems to deal with claims. Bubshait and AlGobali revealed that only two out of nineteen large companies in Saudi Arabia considered the past contractor performance and disputes in their prequalification practices [15]. Sirajaddin and Bajaber investigated carefully 49 cases of construction claims resolved by "Diawan Al Madhalim", a special Saudi government court of litigation [2]. Table (I)

books, repeatable journals, conference reports, newspapers, encyclopedias, and some related internet sites. The review was necessary to narrow down the wide literature to highlight and understand the most relevant work in order to provide a general view of the state of knowledge in the contractor selection topic as well as a close review of its impacts on the construction area of Saudi Arabia. In the conducted

TABLE I  
CLAIMS CLASSIFICATION ACCORDING TO STAKEHOLDER & PROJECT STAGE

Reasons outside Contract	Reasons Related to the Contract						Total
	Design		Bidding		Execution		
	Contractor	Owner	Contractor	Owner	Contractor	Owner	
2%	0%	6%	8%	18%	31%	35%	100%
	6%		26%		66%		

shows the claim classification according to the project's stakeholder (owner/contractor), the project stage, and the case subject. With respect to project's stakeholder, 2% of the disputes happened for reasons outside the contract, 39% under the contractor responsibility, and 59% under the owner responsibility. With respect to project stage; 6% of the cases in the design stage, 26% in the bidding stage, and 66% in the execution stage. The table shows that 32% happened in the design and bidding stages with a 75% under the owner responsibility, 66% happened in the project execution with a responsibility distributed almost equally between contractors and owners i.e. 31% and 35% respectively. The contractor large contribution for defaults brings a question about contractor selection credibility and how could we improve the selection process to avoid such disputes.

Another reason is the extension of the General Agreement on Tariffs and Trade (GATT) into construction industry in which contractors would be able to bid in different parts of the world. One of the reasons that make Bubshait and Al-Gobali studied 19 large companies and surveyed 202 companies, as shown in [15], is to make foreign contractors acquainted with Saudi prequalification requirements. Also, our investigation confirmed that foreign contractor participation is looming in Saudi horizon. This challenge calls for a real movement towards revising the contractor selection. Also, few numbers of researches as well as the considerable critiques they receive another reason call for the study.

As a response to the call of revising the contractor selection strategies in Saudi Arabia, this research is conducted. The research represents an integral part of an undergoing PhD dissertation, at Civil Engineering Department in King Abdulaziz University, about developing a contractor selection model. The main objective of this research is to review the current contractor selection strategies in the Kingdom. This will be done through exploring the most relevant research sources and conducting a series of unstructured interviews with domain experts [8], [9]. The literature sources include

interviews, the interviewee were given the opportunity to talk freely about their experiences and believes. A fourteen key persons, representing public owners and construction contractors, with an average of fifteen-year experience were interviewed. The interviewees consist of decision makers and practitioners as the following: (1) from semi-government companies; three general bid evaluation practitioners, two technical prequalification practitioners, one contract manager, and two project managers. (2) Two contract managers from government departments, (3) one contract manager from a private company, and (4) three decision makers from construction contractors.

## II. CONTRACTOR SELECTION APPROACHES AND STRATEGIES

There are different approaches in contractor selection and for each approach there are different strategies. However, in this paper we are focusing on the strategies of the competitive bidding approach.

### A. Negotiation Approach

The negotiation approach usually deals with single source contractor who becomes alone in a particular job or marked by special characteristics. Since it does not concern with competition, project cost is perceived to be higher by 5% [16]. Beside costs, owners sometimes lack the control of finance aspects; however, Griffith says that problem can be dispelled by a close relationship with a consultant and an implementation of an audited program [17]. In negotiation approach, private managers are more flexible than public managers. A good relationship may be enough justification to keep working with a contractor. However, public managers in Saudi Arabia said they have to show a strong justification for resorting to negotiation approach. Emergency case, for example, is usually enough justification. Project risk is another one to justify the approach especially when it becomes very high, requiring contractor to be highly responsible.

### B. Competitive Bidding Approach

#### 1. One Step, No Qualification, and Single Criterion Decision Making Strategy (Low Bid Method / Open Tender).

Griffith gives a good historical description about the starting point of open tendering which was in America in the mid of nineteenth century when it was accepted for competitive bidding [17]. The goal was to secure public expenditures from any corruptions beside achieving the low costs. The awarding is restricted merely to the lowest price just to reach the highest competition without a real account to quality. The same strategy is followed at the government and some of semi government agencies in Saudi Arabia but with reliance on a classification issued from a specific government agency under the Ministry of Municipal and Rural Affairs which regulates contracting works to protect the public. Its main task is to classify contractors, by conducting financial and technical evaluation, into different fields; each one is classified farther into different degrees according to contractor financial limits. If contractor passes, he would get a Governmental Contractor Classification (GCC) which is admitted as an official license to practice construction works [13], [15], [18]-[20]. However, the investigations reveal that open tender without owner's prequalification leads to many problems. At the construction level, it wastes contractor resources and let low bidders prevail leading to many disputes. While at the project level, it leads to schedule delays, cost overruns, and bad quality. Any one of them may lead to a failure or contractor bankruptcy.

#### 2. Two Steps, Prequalification, and Single Criterion Decision Making Strategy (Selective Tendering)

Selective tendering strategy was introduced in United Kingdom since 1959 to solve the problems of open tender by choosing contractors on selective basis according to their prequalification. Failure and lack of success is solved by selecting a contractor who is responsible to do the job. This responsibility will be guaranteed if he is prequalified. Fig.1 illustrates this concept.

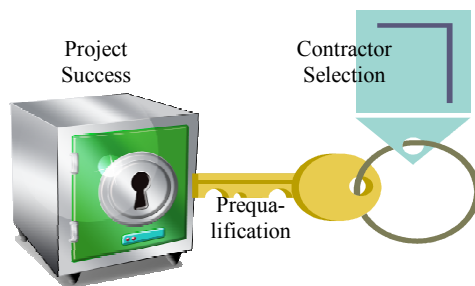


Fig.1 Prequalification and Project Success

The selection in this strategy is performed in two steps; prequalification and bidding. Prequalification is carried out as a passing point for contractors to reach bidding. It ends in a binary decision either contractor is qualified or not. The strategy, by this way, eliminates unqualified contractors to assure owners that only contractors who have certain level of quality will participate [3], [17]. Qualification is the act of

qualifying something according to its ability and quality needed to perform a job [21]. Russel defines prequalification as a process of screening candidates prior to issuing the complete project plans and specifications [3]. Prequalification can be conducted in specific or general. The first one is extensive, for a specific project, fitting contractor portfolio. The second one is less extensive, for a specific type of projects, fitting contractor maximum capacity calculated for a period of time. However, project characteristics in general evaluation are not as highly achieved as in specific evaluation but at least the effort and cost are reasonably accepted. Another disadvantage is the general vagueness exists in general evaluation [3], [17].

The objective of this strategy couldn't be achieved unless prequalification is effective depending mainly on evaluation model and criteria. A model based on fuzzy theory and decision-making analysis was proposed by Yawei, Xiangtian, and Shouyu to assist prequalification process, which was split into two steps; filtration and in detailed multi criteria evaluation [22]. The model criteria, developed by Holt et al [23], are; past performance, past experience, management resources, financial considerations, and contractor's organization. Each one is divided further into sub criteria. The relative importance and the evaluation of contractors are assessed by paired comparison method [24], expressed in fuzzy numbers [25], and aggregated together to calculate the final evaluation scores. Finally, contractors are ranked by using four different methods; FNR method, fuzzy TOPSIS method, fuzzy number weight center method, and simple defuzzification method.

However, Griffith gave a good criticism against selective tendering including; costs, increase in bid prices due to reduction in competition, and insufficient use of criteria [17]. In fact, first and second critiques are not big deals while the third one is the core of criticism. Juselskis and Russel came up with a general consensus among professionals in their survey [26]. They experienced a significant increase in actual project cost when owner had not conducted prequalification. When it had been conducted only small increase was found. The good saving between the two cases is in front of a small investment in prequalification equals by average to 1% [3]. For criteria, we agree that lack of developing right criteria or tailoring them to actual needs are the main reasons behind project problems.

In Saudi Arabia, governmental agencies still rely on price criterion alone without a real resorting to prequalification process [20]. Instead of owner's prequalification, they are satisfied with GCC classification. But there is an argument about GCC whether or not it is enough for qualifying contractors. Baqais argued against the exclusive use of GCC and said it doesn't replace owner's prequalification but instead it can be used as an integral part to prequalification [19]. With respect to private and semi government companies, they follow selective strategy by using their own prequalification beside GCC classification. Alsugair and abuthnain have studied contractor's performance for those who were awarded projects based on GCC alone and those who were awarded

projects based on GCC and owner's prequalification [20]. They concluded that GCC alone does not reflect the contractor capabilities but if it is used along with prequalification, contractors are likely to success. However, the investigations emphasized that there is a problem even with implementing prequalification. Many of semi-government interviewees argued that prequalification is not as same as it should be. Bubshait and Al-Gobali found in their research few of semi government and private organizations in Saudi Arabia (15%) show a better understanding (70% - 91%) of evaluation criteria [13]. There was almost a semi absent involvement for previous records of safety, performance, and disputes.

### 3. One Step, Postqualification Strategy

Reference [3] explains that contractor selection can be achieved through postqualification; an evaluation of contractors after receiving their bids. The evaluators start evaluating the lowest bidder. If he is not qualified, they move to the next one until the tender is settled. However, the settlement is usually delayed especially when the lowest bidder is not qualified. This approach was proposed by AlSugair in a framework developed for Saudi owners to evaluate bidders after receiving their bids [18]. However, the interviewed contractors in our investigation criticized the lowest bidder rejection, saying it puts contractor in an embarrassing situation and wastes his resources as well. Sirajaddin and Bajaber [2] showed some cases of this rejection in Saudi Arabia leading to an extensive litigation and an adversarial relationship. In my opinion, postqualification would not improve competition and, also, the intentions for corruption would be always a matter of suspicion.

### 4. Two Steps, Prequalification, and Multi Criteria Decision Making Strategy

The following example gives some insight into the concept of multi criteria decision making, which is logic to establish an adequate climate for project success. Suppose that two contractors pass a prequalification process and reach into a bidding stage. Both are qualified according to the selective strategy. As per Table (II), contractor A is the winner since he is the lowest bidder. If contractor B is much more qualified and his price is slightly higher, choosing contractor A is contrary to the logic sound which prefers choosing contractor B. This premise, in fact, explains that multi criteria selection is not only a logic sound but also would establish an adequate climate for solving the problem statement of this research. According to this strategy, different models have been proposed such as multi-attribute utility model, dimensional weighing method, performance assessment scoring system,

TABLE II  
COMPETITIVE BIDDING RESULTS  
ACCORDING TO SELECTIVE TENDERING APPROACH

Bidder	Responsibility According to Prequalification Mechanism	Price
Bidder A	Accepted	Low
Bidder B	Accepted	High

and analytical hierarchy process (AHP). Singh and Tiong develop a contractor selection framework based on multi criteria decision making and, also, fuzzy technique, which is suitable to overcome uncertainties associated with judgment [27]. The main decision criteria consist of; tender price, past performance, and performance potential. The performance potential, in return, depends on; financial soundness, managerial capability, and technical competence. The criteria are weighted by using fuzzy terms which converted into fuzzy numbers, averaged, defuzzified, and normalized. Contractors are rated for the each criterion by using the same fuzzy technique with the exception of price criterion in which contractors are rated by dividing the bid price by the estimation. The evaluation score for each contractor is calculated by using simple additive weighting method. The final decision score for each contractor is aggregated. Finally, contractors are ranked based on their final aggregated scores.

However, most of Saudi organizations don't award projects based on multi criteria decision, instead, they decide on price criterion alone [13], [18], [19]. Moreover, few researches have been conducted to deal with multi criteria situation in Saudi Arabia, but they receive a considerable critique. For example, AlSugair developed a framework for Saudi owners based on multi criteria decision making to evaluate bidders and their bids after bid opening [18]. The framework makes a decision based on three types of factor. The first type evaluates the bid documents such as arithmetic mistakes, financial reservation, aware of bid documents, and unsealed pages. The second type evaluates bidder potentials such as accomplishment capability, neglecting duties, financial capability, and contractor capital. However, there is a mix between evaluating bidders and evaluating bid documents which are not same and, hence, should be taken independently. The third type factors, like Zakah clearance and bonds, are not for evaluation but, instead, they are necessary requirements to participate in a bidding stage. Accordingly, most of Saudi researchers and practitioners agreed to call for investigating the current situation.

### C. Third Party Approach

Surety companies are available entities that can share responsibility with contractors in front of owners. For this reason, they conduct an evaluation of contractors against some fees, with an average equals to 1.05% of the total project costs [3]. They conduct this evaluation to be sure that contractor is unlikely to fail so they can, as a third party, guarantee owners the payment of additional funds in case the contractor really fails. Some of public owners in USA used to resort to surety companies alone, who can pay a maximum liability reaching to 100% of the contract amount [3]. Although Surety Company is necessary to guarantee owners a successful project completion, they could not focus at project level as owners can do. They are the best one to provide a thorough financial analysis because they are more close to contractor financial data. Therefore, third party guarantee alone is not enough to avoid failure even if it reaches 100%. The only way

to avoid such failure is through owner's evaluation beside surety companies.

In Saudi Arabia, there is a contribution of commercial banks in the contractor selection with an exception of some special administrations. For example, the General Directorate of Military Works of Saudi Armed Forces don't require bank guarantee for signing their contracts. Their policy is to retain risk rather than transferring it to a third party [4]. However, this contribution is extremely little when comparing with USA. In Saudi Arabia, the maximum liability of the performance guarantee does not exceed 5% of the contract amount for government projects and 10% for semi-government projects [28] while in USA it reaches 100% of contract amount. Therefore, the evaluation effort carried out by Saudi bank is quite small as same as their little contribution in financial guarantee.

### III. SELECTION STRATEGIES ACCORDING TO OWNER CHARACTERISTICS

All practitioners emphasized that public and private owners have one ultimate goal, to find an appropriate contractor who can perform the job without any failure and, at the same time, can achieve the required success. This goal, in my opinion, can be achieved with the following objectives: (1) contractor must be competent by giving owners the best worth of their invested money. (2) Contractor must be responsible to do the job.

The best worth of money can be achieved through competition, while responsibility can be measured through qualification. Competition is exclusive to the lowest price in the viewpoint of public owners because not only they want to achieve the best worth of money but also they want to save it from any corruption. This is why public owners usually resort to the lowest price strategy while private owners neither do.

On the other side, owners have certain characteristics that can be represented by project risks and ownership type [29]. These characteristics, in fact, have strong impact on owner objectives and selection strategies.

Table (III) shows the owner objectives and selection strategies according to their characteristics. If project risk becomes very low, then the competition, for all owners, is at

the highest level while the responsibility is not. The suitable approach is through the competitive bidding approach with open tender strategy. As far as the risk becomes very high, the responsibility, for all owners, will be at the highest level while the competition is not. There will be one approach (single source approach with negotiation strategy) because the situation here is critical and the objective is more focused on responsibility. However, if the risk falls down in between, then several strategies are available based on the ownership characteristic as shown in Table (III).

### IV. SUMMARY AND CONCLUSION

Contractor selection in Saudi Arabia is a very important issue because (1) Saudi Arabia has been experiencing a large construction boom. (2) The construction industry, due to its special nature, is exposed to a number of risks. (3) Contractor is the first one who encounters these risks. If he could not get over them, he would fail and nobody would benefit. This in fact brings to our mind the importance of early preparations before selecting contractors. The main reasons call for investigating the contractor selection in Saudi Arabia are; (1) the large number of defaults in construction projects. Although there was no exact statistics, a sample conducted by Makah province principality, shows that projects defaulted and failed in 18% of the government projects. These defaults might be avoided if owners could have avoided those contractors who are likely to default. (2) The large number of disputes and claims in construction projects. Project disputes increased twofold in the execution period with a responsibility distributed equally between contractors and owners. The contractor large contribution brings a question about selection credibility. (3) The extension of the GATT Agreement into construction industry. The challenge of foreigner participation is looming in Saudi horizon, calling to revise contractor selection according to the international standards. (4) The few number of researches conducted and the considerable critiques they receive.

Researchers, practitioners, and the participants of the Jeddah (2012) symposium about defaulted projects called to revise the current situation of the selection criteria and strategies in Saudi Arabia according to the international

TABLE III  
OWNER OBJECTIVES & STRATEGIES ACCORDING TO THEIR CHARACTERISTIC

Risk Characteristic	Objectives		Ownership Characteristic	Strategy
	Competition	Responsibility		
High	Nil	Very high	Public & Private	Negotiation
Medium	High	High	Public	Selective - Single Criterion Selection
			Private	Selective - Multi Criteria Selection, Negotiation
Low	Very high	Low	Public & Private	Open Tender

standards. As a response, this research is conducted to review the contractor selection strategies as an integral part of an undergoing PhD dissertation to develop a contractor selection model. Although the current investigations represent different project partners, the researchers are going to extend the field investigations to cover a wide range basis.

The competition for selecting a contractor in the construction industry of Saudi Arabia is based on price criterion without a best practice of qualification and selection. This is not perfect and considered as a reason behind the appearance of unqualified contractors, who might be behind defaults and failures that damaging all partners.

To form a contractor selection strategy, there are many techniques can be used. For example, multi criteria is a good technique to reach an optimum decision. It is not only a logic sound but also would establish an adequate climate for the selection strategy. Prequalification and postqualification are another techniques used with multi criteria evaluation to assess the contractor responsibility. We recommend prequalification because postqualification may delay the awarding or reject the lowest bidder leading to an adversarial relationship. Secondly, postqualification is urgent while prequalification is not. Selecting contractor in a competition is a critical decision i.e. urgent in time and sensitive in nature. Any misunderstanding may lead to a problematic situation. Therefore, evaluation process should be moved as much early as possible before selection process in a time which is not urgent and a case which is not sensitive. Finally, prequalification is more appropriate to protect the public owners from corruption. The disadvantage of using prequalification is presented in the ambiguities and incomplete information inherited in the process. This disadvantage can be mastered through using fuzzy techniques. Third party guarantee is another technique to assess the contractor responsibility. It is more oriented to contractor financial aspects than project issues. Therefore, it is recommended to be used along with owner evaluation.

#### REFERENCES

- [1] AlJarallah M., "Construction industry in Saudi Arabia", J.C.E.M., V109 (4), 1983.
- [2] Sirajaddin A. and Bajaber M., Claims and Arbitration in Engineering Contracts, 1st Ed. (Arabic), IS.9786030043156, 2010.
- [3] Russell J. S., Constructor Prequalification: Choosing the Best Constructor and Avoiding Constructor Failure, 1996.
- [4] AlSobiei O. S., Arditi D., and Polat G., "Predicting the risk of contractor default in Saudi Arabia utilizing ANN and GA techniques", C.M.E., V23, PP423-430, May 2005.
- [5] Hanfi A. , A contractor: Hanfi Establishment for Trading and Contracting, "A Future guarantee for project continuous and default avoidance", a paper submitted for Defaulted Project Management Symposium, Eighth Annual Meeting of Saudi Society for Civil Engineering, Jeddah, 2012.
- [6] Brahmin S. Y., secretary general of Makah development institution, "The Default of some construction projects in Makah provience", a paper submitted for Defaulted Project Management Symposium, Eighth Annual Meeting of Saudi Society for Civil Engineering, Jeddah, 2012.
- [7] Harasani H. A., a contracting committee member in chamber of commerce at Makah, "Contracting defaults: analysis and solutions" a paper submitted for Defaulted Project Management Symposium, Eighth Annual Meeting of Saudi Society for Civil Engineering, Jeddah, 2012.
- [8] Saunders M. Lewis P., and Thornhill A., Research Methods for Business Students, Third Edition, 2003.
- [9] Fellows R. and Liu A., Research Methods for Construction, Blackwell Publishing Company, Second Edition, 2003.
- [10] Alabidien, H., "Assessment of the structural safety of concrete buildings", 2nd Saudi Engineers Conference, V5, PP2821-2854, King Fahad University of Petroleum and Minerals (KFUPM), Dhahran, Nov. 1985.
- [11] Fatani, M., "Construction supervision: past experience", 2nd Saudi Engineers Conference, V5, PP2855-2878, University of Petroleum and Minerals, Dhahran, Nov 1985.
- [12] Alhazmi, M. H., "Causes of delay in large building projects", M.Thesis, (KFUPM), Dhahran, 1987.
- [13] Bubshait A. and Al-Gobali K., "Factors considered in contractor prequalification in Saudi Arabia, the 4th Saudi Engineering Conference, V1, Nov1995.
- [14] AlTubayyeb, S. A., "Improving Construction Contract Administration Utilizing Multi-Attribute Statist. Analysis on Bid Stage Inform.", PHD dissertation, University of California at Berkeley, 1989.
- [15] Bubshait A. and Al-Gobali K., "Contractor prequalification in Saudi Arabia", J.M.E., V12(2), 1996.
- [16] Ashworth A., Pre-Contract Studies, Development Economics, Tendering and Estimating, Longman - Harlow, 1996.
- [17] Griffith A., Knight A., King A., Best Practice for Design and Build Projects, 1st Ed., 2003.
- [18] Alsugair, A., "Framework for evaluating bids of construction contractors", J.M.E., V15 (2), PP72-78, 1999.
- [19] Baqais A. S., "Contractors prequalification: a requirement for avoiding the bad performance", AlEqtisadia Newspaper, No.6066, 21May 2010.
- [20] Alsugair A. and Abuthnain M., "Assessment of the government contractor classification system in Saudi Arabia", Advanced Materials Research, V250-253, PP345-355, 2011.
- [21] Collins, Collins English Dictionaries, <http://www.collinsdictionary.com/dictionary/english/qualification>, May 2012.
- [22] Yawei Li, Xiangtian Nie, and Shouyu Chen, "Fuzzy Approach to Prequalifying Construction Contractors", J. Constr. Engrg. and Mgmt, V133(1), PP40-49, Jan2007.
- [23] Holt G. D., Olomolaiye P. O., and Harris F. C., "Evaluating prequalification criteria in contractor selection", build. Environ, V29 (4), PP437-448. [ISI], 1994.
- [24] Chen S., Fuzzy System Decision-Making Theory and its Application, University of Technology Press, Dalian, China, 1994.
- [25] Cheng C. H., and Lin Y., "Evaluating the best main battle tank using fuzzy decision theory with linguistic criteria evaluation", Eur. J. Oper. Res., V142 (1), PP174-186, 2002.
- [26] Jaselskis E. and Russell J., "An Efficiency structured approach for selection of most promising construction contractors", Project Management Institute (PMI), V22 (4), PP31-38, 1991.
- [27] Singh D. and Tiong R. L. K., "A Fuzzy decision framework for contractor selection", J.C.E.M., V131 (1), PP62-70, Jan 2005.
- [28] Stevens J. and AlDulaijan S., "Contractor financing, public works in Saudi Arabia", J.C.E.M., V115 (1), 1989.
- [29] Russel J. and Skibniewski M., "Decision criteria in construction prequalification", J.M.E., V4 (2), App 1988.